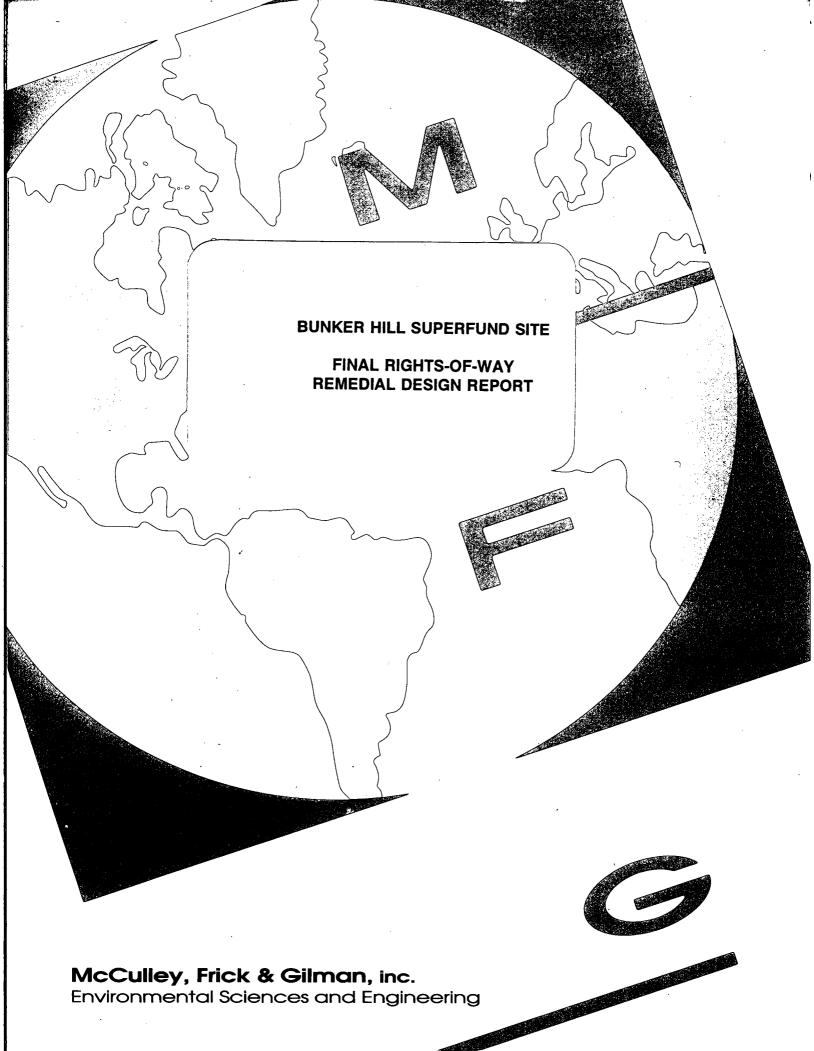
USEPA SF

5/10/94 5/10/94



BUNKER HILL SUPERFUND SITE

FINAL RIGHTS-OF-WAY REMEDIAL DESIGN REPORT

March 1994

Prepared For:

ASARCO INCORPORATED, HECLA MINING COMPANY, SUNSHINE MINING COMPANY

TABLE OF CONTENTS

LIST	OF TABLES
LIST	OF FIGURES
1.0	INTRODUCTION
2.0	TECHNICAL ANALYSIS
3.0	DESIGN
4.0	CONSTRUCTION CONSIDERATIONS
5.0	OPERATION AND MAINTENANCE
6.0	SUMMARY OF PERTINENT REMEDIAL DESIGN INVESTIGATIONS 6-:
7.0	FUTURE DELIVERABLES (PLANS AND REPORTS)
8.0	CERTIFICATION OF COMPLETION OF REMEDIAL ACTION 8-:
9.0	REFERENCES

LIST OF TABLES <u>Title</u>

<u>Table</u>

3-1 Required Remedial Actions for Area I ROW

LIST OF FIGURES

<u>Figure</u> <u>Title</u>

3-1 Decision Matrix for ROW Remedial Action

BUNKER HILL SUPERFUND SITE

FINAL RIGHTS-OF-WAY REMEDIAL DESIGN REPORT

1.0 INTRODUCTION

This Remedial Design Report (RDR) presents remedial designs to control direct contact risk and contaminant migration from certain rights-of-way (ROW) of the Bunker Hill Superfund Site (Site). This document clarifies and refines concepts outlined in the September 1992 Record of Decision (1992 ROD) and the Bunker Hill Remedial Design and Remedial Action Area I Statement of Work (SOW) for the Site. Specifically, this RDR presents the technical analysis, design, and construction details necessary to develop the ROW Element of Residential Areas Annual Remedial Action Work Plans (addressed below). Also presented is a summary of existing information pertinent to the designs for ROW remediation and a discussion of operations and maintenance (O&M) considerations.

Rights-of-way addressed by this RDR are those within the boundaries of Area I, as shown on the Bunker Hill Site Allocation Map (Attachment C to the Consent Decree). No other ROW will be remediated by the Settling Defendants. The work will be performed by the Settling Defendants pursuant to Residential Areas Annual Remedial Action Work Plans. As described in greater detail in Section 7.0, these plans will be prepared to address remediation of all residential yards, ROW, and commercial properties, as well as water well closures expected to be completed during that year's construction season.

1.1 OVERVIEW

The following is the list of ROW identified in the Bunker Hill Superfund Site, as presented in the Feasibility Study [FS; McCulley, Frick & Gilman, Inc. (MFG), 1992a]. Several of these ROW traverse Area I, as well as other areas of the Site. Others, such

as the main railroad ROW, are outside Area I altogether, as defined by the Allocation Map.

• Interstate Highway 90 (I-90) corridor, including the highway interchanges, which crosses the seven-mile length of the Site.

TENERS ...

- Primary Idaho State and Shoshone County highways and roads. These roads are surfaced with pavement or gravel and total approximately 7.8 miles in length.
- Main Railroad ROW, which crosses the seven-mile length of the Site.
- Secondary access roads. These roads are surfaced with gravel and include the Ski Hill Road from Wardner to the south Site boundary, the Little Pine Creek Road from Pinehurst to its end, and the Page area roads. These roadways total approximately 3.3 miles in length.
- Washington Water Power (WWP) easements, including cross-country electrical transmission lines (approximately 40 miles in length), overhead electrical distribution lines, buried electric distribution cables (approximately 0.85 mile in length), transformer substations, a cross-country natural gas pipeline owned and operated by Northwest Pipeline Corporation (NPC; approximately 6.2 miles in length), a natural gas metering station, natural gas distribution pipelines (approximately 22 miles in length), and access and construction roads.
- City of Kellogg gondola, an aerial tramway to the Silver Mountain Ski area operated by the City of Kellogg.
- Buried utilities, including water and sewer mains and major laterals owned and operated by the Central Shoshone Water and Sanitation District; natural gas distribution pipelines; and telephone lines. The water and sewer main and major lateral ROW are approximately 68 miles in length.
- City streets and alleys not addressed by the residential yards remediation program.

This RDR focuses on: 1) identifying Site ROW from the above categories that are in Area I and may require remediation; 2) developing a procedure to establish the need for remediation; 3) providing basic designs for remediation of various ROW categories that are consistent with surrounding areas and current land use;

and 4) presenting the specific criteria and procedures necessary for implementation of the basic designs.

1.2 PERFORMANCE OBJECTIVES AND STANDARDS

The performance objectives of the remedial actions to be implemented for ROW within Area I are to control direct contact risk and migration of contaminants originating from ROW through air and water. These objectives will be achieved through attainment of the primary Performance Standard for the ROW Element of Work: enhancement or placement of a barrier consistent with land use, where lead concentrations are 1,000 ppm or greater in the top six or twelve inches of soil. Sampling of ROW to determine if the 1,000 ppm lead Performance Standard is exceeded shall be consistent with the residential yards sampling program (see Appendix B of the Residential Yards RDR).

Performance Standards for the ROW Element of Work are as follows:

- ROW include state, county, local and private roads.
- All ROW with lead concentrations of 1,000 ppm or greater in the top six or twelve inches of soil shall receive, upon EPA approval, in consultations with the State, one or more of the following treatments: revegetation, barrier placement, removal/replacement and/or access control, dependent upon geographic location and current land use. Barrier type and thickness will also be determined based on geographic location and current land use.
- ROW adjacent to residential properties will be sampled at the 0- to 1-, 1- to 6-, 6- to 12-, and 12- to 18-inch intervals. ROW located within Area I, as described by the Site Allocation Map, but not adjacent to residential properties will be sampled at the 0- to 1-, 1- to 6-, and 6- to 12-inch intervals. Sample collection and analysis will be conducted consistent with Appendix B of the Residential Yards RDR.

- ROW where access is restricted and where vegetative cover is 85 percent or greater require no additional remedial action. If access is restricted and vegetative cover is less than 85 percent, direct revegetation will occur.
- Where barriers are utilized, the barriers shall have sufficient durability to minimize future operation and maintenance requirements.
- Within residential areas, ROW adjacent to residential properties shall be treated utilizing methods presented in the Residential Yards RDR. These methods will result in a minimum 12-inch protective barrier over soils with lead concentrations of 1,000 ppm or more.
- ROW in non-residential settings shall be remediated in a manner consistent with the adjacent properties and existing usage. These properties, if not accessrestricted, shall receive a minimum of a 6-inch protective barrier.
- Excavated soils shall be consolidated in the Page Pond Repository or other area approved by EPA in consultations with the State.
- The exact nature of each ROW remediation shall be determined on a case-by-case basis through the process outlined in the ROW RDR.

Remedial actions for ROW will be consistent with those implemented in the surrounding area. The relationship of the above Performance Standards to selection of appropriate remedial actions is further addressed in Section 3.0.

An additional design criterion is the successful establishment of vegetation for ROW assessed to require seeding. This criterion requires the reseeding of areas not achieving 85 percent cover in three years.

2.0 TECHNICAL ANALYSIS

This section provides a general overview of planned ROW remedial activities in Area I along with supporting technical analyses. Section 2.1 presents an overview of remedial actions to be implemented for the various ROW categories and how these actions meet the applicable Performance Standards. Section 2.2 provides identification and categorization of ROW. Related previous Site studies and actions are summarized in Section 2.3.

2.1 REMEDY OVERVIEW

To a great extent, those ROW existing within Area I consist of roadways and alleys. Such ROW will typically be remediated in conjunction with the adjoining residential and commercial properties. As such, special remedial action planning efforts will not be required. However, in certain instances, an ROW may be more effectively remediated as a separate action. An example would be a dirt alleyway which may, in some instances, be better remediated as a continuous effort rather than as a combination of piece-meal efforts coinciding with remediation of adjacent properties. Specific plans for ROW within a given geographic portion of Area I will be presented in the Residential Areas Annual Remedial Action Work Plans and will consider analytical results for ROW as well as commercial and residential properties within the area(s) being addressed during a construction season.

A summary of remedial actions developed for contaminated portions of ROW is provided below. When matched properly with ROW requiring remediation, these actions are expected to meet the Performance Standards listed in Section 1.2. The Remedial Investigations (RI) for the populated and non-populated areas of the Site and the database accumulated through actions implemented under the 1991 and 1992 Administrative Orders on Consent (AOC) were utilized in the development of these options (CH2M Hill,1991; MFG,1992b).

Removal and replacement measures will be utilized within the residential portions of Area I as part of the residential areas remediation program. Consistent with the Residential Yards RDR, soils with lead concentrations equal to or exceeding 1,000 ppm in the top six or twelve inches will be removed from ROW with uncontrolled access integrated in or adjacent to a residential property, prior to barrier installation. Excavated contaminated soils will be consolidated at the Page Pond Repository or other area approved by EPA in consultations with the State.

Barrier installment will generally be used in all areas requiring remediation. Barrier installment will be accomplished through placement of 6 or 12 inches of clean soil followed by revegetation (see below) or, alternatively, placement of a 6- or 12-inch rock cover where land use necessitates additional durability. At the option of the Settling Defendants, pavement may be used in place of a rock barrier, in which case its minimum thickness will be specified by the Institutional Controls Program (ICP). Barrier placement will occur in conjunction with removal activities or may occur directly upon existing contaminated soils where grade and drainage requirements allow.

Revegetation actions on ROW will consist of one or more of the following, which will be established on a site-specific basis:

- seeding of clean soil covers;
- 2. sod application (for selected areas); and/or
- 3. direct seeding of the existing surface for areas not receiving a barrier to enhance existing vegetation.

Seeding of clean soil covers is the predominant revegetation component of remedial actions expected to be implemented in Area I. Direct revegetation of existing soils or enhancement of existing vegetation may be used as a barrier in those areas that are not readily accessible to the public (e.g., fenced substations). Sod will be applied to clean soil covers in residential areas and also

in those selected instances where immediate revegetation is required to protect the underlying cap from disruption.

Access controls may be used in areas that have already been remediated and/or do not pose a threat due to wind or water transport, or transport from vehicle or pedestrian traffic. In other areas, access controls may be used to reduce the required barrier thickness or in lieu of a soil barrier. For example, fencing a ROW within a residential area would allow the use of a 6-inch barrier, or possibly direct revegetation as noted above.

An Institutional Controls Program (ICP) will be implemented in conjunction with the actions described above to limit the potential for future human exposure to contaminated surface materials and to protect planted areas from disturbance.

2.2 ROW IDENTIFICATION/CATEGORIZATION

A listing of identified ROW categories within the Bunker Hill Superfund Site, including estimated lengths, where applicable, is provided in Section 1.1 of this RDR. However, only a portion of these ROW categories are included in Area I. Area I includes the following ROW categories:

- the I-90 corridor;
- primary highways and roads;
- city streets and alleys that are not addressed by the Residential Yards RDR;
- WWP substations; and
- buried utility corridors...

Many of the above-listed ROW traverse both Area I and other portions of the Bunker Hill Superfund Site. As previously noted, only those ROW segments traversing Area I will be remediated by the Settling Defendants.

2.3 DESCRIPTION OF PREVIOUS STUDIES/ACTIONS

Selected ROW identified above were sampled, and in some instances remediated, under several programs conducted at the Site. These programs include the RI, the 1986 Fast Track program, and activities implemented under the 1991 and 1992 AOC. These past investigations have aided in identifying ROW of concern.

Non-Populated Areas RI

During the RI, samples were taken along I-90 to characterize this ROW in terms of lead contamination (MFG, 1992b).

The I-90 ROW received barrier material when the Idaho Transportation Department (ITD) added soil and rock to the ROW outside of the paved shoulders in 1976 and 1977. These actions were taken to make the areas wider and flatter for safety reasons. This resulted in providing a barrier over the jig and flotation tailings that had been relocated to serve as a base for I-90.

Samples taken from the I-90 road shoulders during the RI (after the ITD placed the capping material) indicate that surficial (0- to 1-inch) lead concentrations ranged from 515 to 1680 mg/kg. It is probable that the elevated metal concentrations along the I-90 corridor are attributable to the use of lead smelter slag by the ITD as a traction agent during icy conditions, a practice that was terminated within the Site by 1988¹. Metals within the slag are generally not prone to leaching. Additionally, the relatively large slag particles are not readily amenable to transport by wind or water. Capping materials currently in place on unpaved shoulders and access restrictions associated with federal highways, indicates that contaminant migration is controlled and direct contact is limited in the I-90 ROW. The status of access and usage of the I-90 ROW within Area I will be evaluated, along with other

Mr. Ed Pommerening, Pintlar Corporation, Kellogg, Idaho; personal communication, December 2, 1992.

properties, during the planning stage for the various Reasonably Segregable Areas.

Fast Track

Certain locations in the populated areas of Smelterville, Kellogg, and Wardner were sampled in 1986 as part of an emergency "Fast Track" removal program. The properties treated under the 1986 Fast Track program are either commercial properties or ROW. The following is a list of ROW believed to be addressed during the Fast Track program:

Kelloqq:

- Station Avenue (an unpaved roadway).
- Old Highway 10 road shoulders.

<u>Smelterville</u>:

- McKinley Avenue road shoulders.
- Asphalt turnout west of City Park.
- Washington Street roadway and shoulders.

Wardner:

Main Street shoulders.

Caps of crushed rock were applied to the above ROW during the 1986 Fast Track activities. Rights-of-way that were treated during the Fast Track activities may have become recontaminated from wind blown sources and municipal and private activities. Two of these ROW (Station Avenue and the McKinley Avenue road shoulders) were resampled under an AOC and are known to need additional remedial measures. Because of the elapsed time since remediation and differences in sampling and remediation requirements between the 1986 Fast Track Program and this RDR, all Fast Track ROW in Area I will be included in future sampling programs.

1991 and 1992 AOC Actions

Pursuant to a July 1991 AOC, EPA requested certain early remedial action to control fugitive dust emissions at the Bunker Hill Site. Site reconnaissance, followed by a soil sampling program in the spring of 1991, yielded the locations targeted for dust control in 1991 and 1992 pursuant to the AOC. For ROW, the 0-to 2-inch interval on the running surface of dirt and gravel was sampled while paved roads were sampled at the unpaved shoulders.

During the preparation of Residential Areas Annual Remedial Action Work Plans, any ROW within Area I remediated under an AOC will be investigated to assess the adequacy of current barrier protection. Resampling will be required in most instances because samples collected under an AOC were taken only from the 0- to 2-inch depth increment. Sample results from activities conducted under an AOC will not be used to establish that a ROW is below the 1,000 ppm lead threshold. However, the existing results may be used to support a decision to remediate without further sampling.

3.0 DESIGN

This section describes the process through which remediation decisions will proceed for ROW present within Area I. The discussions address the following steps in the process:

- sample collection and evaluation of results;
- site assessment and selection;
- establishment of a collective agreement between the property owner, the Settling Defendants, IDHW, and/or EPA;
- location of buried utilities;
- preparation of a site plan, with photo documentation; and
- selection of remedial actions required to meet the applicable Performance Standards.

Each Draft Residential Areas Annual Remedial Action Work Plan will delineate the ROW and the proposed barrier thickness and material specifications for those ROW to be remediated during the corresponding construction season. The barrier selected for each ROW will meet the applicable Performance Standards, will be established in consultation with the property owner, and will generally be similar to the type of material in place at the time of remediation.

3.1 SAMPLE COLLECTION AND EVALUATION OF RESULTS

Additional ROW soil sampling will be required in Area I for ROW not addressed by the Residential Yards RDR or the Commercial Properties RDR. These ROW are chiefly gravel road surfaces, alleys, and road shoulders. Adjacent to residential properties, the ROW will be sampled at the 0- to 1-inch, 1- to 6-inch, 6- to 12-inch, and 12- to 18-inch intervals (12- to 18-inch results will be recorded for ICP purposes only). Areas not adjacent to residential property, but within Area I, will be sampled at the 0-

to 1-inch, 1- to 6-inch, and 6- to 12-inch intervals (6- to 12-inch results will be recorded for ICP purposes only). Four subsamples will be taken within every 1000-foot section along the ROW (0, 250, 500, and 750 feet). The subsamples will be mixed to create a composite sample representative of the 1000-foot section, and the composite will be analyzed for total lead concentration. where the ROW is shorter than 1000 feet (e.g., near residential properties), representative subsamples will be taken every 200 feet at a frequency to provide a minimum of two subsamples. All samples will be screened to minus 80 mesh prior to analysis. Analyses will be conducted according to guidelines set forth in Appendix B of the Residential Yards RDR. Sample results, in conjunction with current land use, will be used to establish the required remedial action for each ROW segment within Area I. Those ROW with lead concentrations equal to or exceeding 1,000 ppm in the top six or twelve inches of soil will require remedial action, as specified in Section 3.6. If ROW soil lead levels in the 0- to 1-, 1- to 6-, or 6- to 12-inch interval are between 900 and 1,000 ppm and the property owner requests a resample, then the EPA/IDHW will resample the area in question in accordance with Appendix B of the Residential Yards RDR. All sampling results will be provided to the administrators of the ICP for inclusion in their database.

Previously sampled and/or remediated ROW within Area I will be evaluated for conformance with the Performance Standards set forth in Section 1.2 of this RDR. Remediated ROW found to be in conformance with the barrier requirements of this RDR will be visually inspected for indications of disturbance of the barrier or evidence of recontamination. All previously remediated ROW in Area I that were not remediated in conformance with the requirements of this RDR, or those which show indications of barrier disturbance or recontamination, will be resampled and remediated as necessary using the methods prescribed herein. Sampling results from previous studies will also be evaluated for conformance with the These results may be utilized requirements. remediation determinations if the sample collection procedures are generally consistent with those set forth in the Residential Yards RDR.

Sampling will not be required as a basis for determining the need for remediation in areas that obviously contain contaminant levels above 1,000 ppm lead. These areas include locations where the planned sampling intervals consist of visually identifiable tailings or mine waste rock areas, where historical sampling results are well above the 1,000 ppm lead criteria, or where adjacent properties or areas provide strong indicators of the presence of such material. In these cases, remedial action may automatically be performed according to the requirements set forth in Section 3.6. It is anticipated that this scenario will apply to ROW adjacent to residential and commercial properties requiring remediation.

3.2 SITE ASSESSMENT AND SELECTION

Rights-of-way segments will be selected for remediation as follows:

- 1. Each ROW segment will be located within the Area I boundaries as shown on the Bunker Hill Superfund Site Allocation Map. Each Residential Areas Annual Remedial Action Work Plan will specify those ROW segments to be sampled during the corresponding construction season. Sampling will be conducted per the guidelines described in Section 3.1 above and in conformance with the specific procedures outlined in the SAP in Appendix B of the Residential Yards RDR. Rights-of-way will be selected for remediation during the subsequent year's construction season if the corresponding soil samples equal or exceed 1,000 ppm lead, as discussed in Section 1.2. An exception is the first year of construction activities, wherein sampling and remediation of selected ROW will occur in the same construction season.
- 2. Each Residential Areas Annual Remedial Action Work Plan will specify ROW segments to be remediated during the corresponding construction season, based on sample information collected during the previous year. Remediation will be performed on an area-by-area basis. The ROW segment must be within the areas scheduled for remediation during that construction season. The

- construction season is considered to be from June 15 to mid October, barring unusual weather.
- The owner of the ROW shall have entered into a collective agreement (see next section) that allows representatives of EPA, IDHW, Panhandle Health District (PHD), and the Settling Defendants access for entry, sampling, removal of contaminated soils, and remediation. The agreement will also provide for access for cap maintenance and inspection activities by the Settling Defendants. Access for PHD, EPA, and IDHW for future audits to evaluate cap integrity will also be addressed in the access agreement.

3.3 COLLECTIVE AGREEMENT

The collective agreements among the owners of ROW properties, Settling Defendants and IDHW, EPA, or their designee, including access agreements, will be completed prior to starting remediation activities. It is anticipated that a single comprehensive collective agreement will be obtained from each of the major ROW property owners (e.g., local communities and utilities), which will apply for the duration of the construction activities. Separate collective agreements will not be necessary for ROW such as boulevards, road shoulders, and alleys, which are being remediated concurrently with commercial and residential properties. These agreements will include a definition of the type of remediation to be conducted in each ROW segment or type. Site-specific features for each ROW will be identified and collectively agreed upon by the above-mentioned parties and, where applicable, will include the following:

- Access to the ROW by contractor work crews;
- Excavation limits;
- Plants to remain;
- Cultural features, if any, to be removed by the owner;
- Cultural features, if any, to be removed by the contractor;
- On-site access to water (if required);

- Removal or relocation of utilities and subsurface obstacles in the way of the remediation efforts;
- Prudent care of the new vegetation and long-term requirements for established vegetation by the property owner;
- A list of asset damage that exists prior to remediation work being conducted;
- Special items of concern collectively agreed upon by the Settling Defendants, EPA, and/or IDHW and the owners of the ROW;
- Maintenance obligations of the property owner required by the ICP; and
- Estimated schedule for remediation.

The overall schedule for remediation of residential yards will control the schedule for ROW remediation. Once collective the remediation are completed, contractor representatives will schedule a group of residential, commercial, and ROW properties located within the same vicinity or community to be prepared for remediation. Scheduling groups of properties together for remediation is necessary to limit disruption of a community and fugitive dust from trucks traveling through the safety concerns associated streets, and because of transportation.

3.4 UTILITIES LOCATION

The remediation contractor will arrange with the local utility companies to visit each ROW scheduled for remediation and locate electrical, water, sewer, gas, cable, and phone lines. The utility company will be requested to mark these utilities on the ground with colored spray paint. The ROW owner will be notified of this site visit and asked to participate, if needed, to provide information on subsurface obstacles such as abandoned lines. In some instances, the ROW owner may be one or more of the local utility companies and, therefore, their participation will be mandatory. The remediation contractor will scan each ROW or ROW

segment for visible obstacles, and may utilize an electromagnetic detector if there is reason to suspect buried obstructions have not been marked (i.e., sprinkler systems). Locations of subsurface obstacles will be confirmed by the remediation contractor, if necessary, by hand digging to trace the orientation of the obstacle and to mark it adequately with spray paint. The type and location of the obstacle will be placed on the plot plan, which will be issued to all work crews prior to remediation startup.

3.5 SITE PLAN & PHOTO DOCUMENTATION

The remediation contractor will develop a plan for each ROW or ROW segment that will record all site-specific items identified in the access agreements. The site plan will map out areas for remediation, known caution zones with subsurface obstacles, and all utility locations that were marked during prior site assessment tasks. In many instances within Area I it is anticipated that ROW such as boulevards, alleys, and road shoulders will be included in the plot plan for adjacent commercial or residential properties and a separate site plan will not be required.

The site plan will include a scale drawing that will record planned and actual remediation, including the following:

- Total depth of soils, gravel, and/or sod excavated on each site;
- Ingress and egress areas;
- Conditions of the existing area including drainage problems, structures, and placement of cultural items;
- Location of fences, approximate location of property boundaries, and demarcation stakes;
- Special instructions for field work crews, if any;
- Soil sampling data;
- Limits of excavation;
- Trees, shrubs, plants and landscaping to remain or be removed;

- Results of field verification program for barrier thickness; and
- Need for and placement of a visual barrier.

The site plan will be used as a record for site-specific conditions that warranted such actions and all remediation activities that were completed. The site plan will be signed by the Settling Defendants' representative, the owner and the EPA and/or IDHW representative both before work is commenced and at its completion, signifying acceptance by all parties. Prior to final sign off by the parties, the site plan will be revised to show actual work performed. The site plan will provide a detailed record of the remedial action planning efforts as well as the completed remedial action.

Photo documentation, by still photographs and/or videotapes, will be used to record pre-remediation and post-remediation conditions of an ROW or ROW segment. In the event a dispute arises between the remediation contractor or the Settling Defendants and owners or local governments, the photo documentation will be used to substantiate any claims. Every attempt will be made to resolve the dispute informally within the scope of work for that ROW. If the ROW owners and remediation contractor or Settling Defendants cannot reach an agreement, a final decision concerning the dispute will be made by a three-member Arbitration Panel consisting of one representative each from 1) EPA or the State of Idaho; 2) the Settling Defendants; and 3) a local government in the Silver Valley. An agreement to be used for this procedure is attached as Appendix F in the Residential Yards RDR.

The photo documentation will become a portion of the permanent record for each remediated ROW. The site plans and photo documentation will be provided to the administrators of the ICP for use in the tracking system. In addition, a copy of the completed and approved site plan will be provided to the ROW owner.

3.6 REQUIRED REMEDIAL ACTIONS

Table 3-1 lists the remedial actions that are generally appropriate for ROW segments within Area I with surface soil lead concentrations equal to or greater than 1,000 ppm.

Institutional controls on land use, speed and vehicle size limits on unpaved roads, and disposal plans for soils excavated during future construction and site development are likely components of the ICP that will augment remediation of the ROW. Implementation of these controls plays an integral role in ensuring the longevity of the remedial actions selected.

Installation of barriers should reduce risks from contaminated soils to humans and other receptors. Barrier materials that will be utilized on Area I ROW segments include clean soil (as defined in the SOW) and/or rock. Sources of these materials may vary depending upon suitability and availability. Barrier durability for the intended use of the remediated ROW or ROW segment is the key element in barrier type selection. Barriers will be similar to the type of material on the ROW at the time of remediation, and will not involve large scale upgrades such as paving.

Barrier thickness will be established based on ROW location and use. A decision tree is presented in Figure 3-1 which explains the logic to be used in establishing sampling depths and barrier thicknesses for ROW or ROW segments located in Area I. Rights-of-way situated within Area I will be further categorized as 1) located within or adjacent to residential properties or Type 1 commercial properties (i.e., those with unrestricted access by children 0 to 12 years of age and/or pregnant women), 2) located within or adjacent to Type 2 commercial properties (i.e., those with restricted/limited access or that are not primarily utilized by children 0 to 12 years of age and/or pregnant women) or in undeveloped areas, or 3) ROW areas where access by the general population is prohibited by physical barriers such as fencing

and/or legal statutes (i.e., I-90 corridor). Remediation strategies for these situations are described below.

For each ROW with unrestricted access within or adjacent to a residential property or Type 1 commercial property with 1,000 ppm lead or greater in the 0- to 1-inch and/or the 1- to 6-inch depth increment composite samples, but with less than 1,000 ppm lead in the 6- to 12-inch depth, one of the following remedial actions will be prescribed:

- Removal of the top six inches of material, followed by placement of six inches of an appropriate barrier material; or
- Placement of a visual marker on the existing material surface if future disturbance of the barrier is likely, followed by 12 inches of an appropriate barrier material.

If sampling results for an ROW within or adjacent to a residential property or Type 1 commercial property show 1,000 ppm lead or greater in the 6- to 12-inch depth, but less than 1,000 ppm lead in the 0- to 1-inch and 1- to 6-inch depths, one of the following remedial actions will be prescribed:

- Placement of six inches of an appropriate barrier material; or
- Removal of 12 inches of material, followed by placement of 12 inches of an appropriate barrier material. A visual marker will be installed prior to placement of 12 inches of an appropriate barrier material if the 12- to 18-inch sample is greater than or equal to 1,000 ppm lead.

If sampling results for a ROW within or adjacent to a residential property or Type 1 commercial property show lead concentrations of 1,000 ppm or greater in the 0- to 1-inch and/or 1- to 6-inch and the 6- to 12-inch depth increments, one of the following remedial actions will be prescribed:

- Placement of a visual marker on the existing material surface followed by 12 inches of an appropriate barrier material; or
- Removal of 12 inches of material, followed by placement of 12 inches of an appropriate barrier material. A visual marker will be installed prior to placement of 12 inches of an appropriate barrier material if the 12- to 18-inch sample is greater than or equal to 1,000 ppm lead.

Visual markers shall consist of geofabric or other suitable material.

If sampling results for a ROW within or adjacent to a Type 2 commercial property show 1,000 ppm lead or greater in the 0- to 1-inch and/or the 1- to 6-inch depth increment composite samples, one of the following remedial actions will be prescribed:

- Placement of a visual marker on the existing material surface followed by six inches of an appropriate barrier material on the existing material surface; or
- Removal of six inches of material, followed by placement of six inches of an appropriate barrier material. A visual marker will be placed prior to placement of six inches of an appropriate barrier material if the 6- to 12-inch sample is greater than 1,000 ppm lead.

For ROW within or adjacent to Type 2 commercial properties, the 6-to 12-inch depth increment samples will be collected for ICP documentation. Also, if the 6- to 12-inch depth sample results show lead concentrations greater than or equal to 1,000 ppm and there is a high probability of disturbance in the six inches of applied barrier, a visual marker (e.g., geofabric or other suitable material) will be installed prior to the placement of the 6-inch barrier.

ROW areas where access is limited by physical barriers such as fencing and/or legal statutes will not require removal activities nor barrier installation. Due to the restricted access, remedial

activities in these areas will be limited to revegetation, unless visibility concerns or fire hazards preclude the presence of vegetation. The need for such revegetation in access-restricted ROW areas will be considered on a case-by-case basis. In addition, the need for removal/ replacement activities will be considered on a case-by-case basis for ROW areas where prolonged access by the general population is unlikely. Such areas include the grassy shoulders of Highway 10 on the west edge of Smelterville. Such areas may also be revegetated, if required. The need for remedial action in both types of ROW areas will be established through the Residential Areas Annual Remedial Action Work Plan review and approval process.

3.6.1 Removal and Replacement

Removal of contaminated soil will be conducted as described in the preceding section. As previously noted, removals under this RDR may also include those necessary to meet existing grading and drainage requirements. Any excavated contaminated soil will be consolidated at the Page Pond repository or other EPA-approved area.

3.6.2 Clean Soil Barriers

The decision to utilize a clean soil barrier will be based upon the condition of a ROW with respect to vegetative cover and accessibility (i.e., direct contact risk). Areas with vegetative cover greater than 85 percent and without a significant potential for direct contact would not require a barrier. Examples of this type of area are the previously-cited grass shoulders of Old Highway 10 within Area I on the west edge of Smelterville. These shoulders are well vegetated and do not require an additional barrier as the potential for contaminant migration and/or direct contact is relatively low.

Possible sources of acceptable clean soil materials include topsoil from nearby areas and overburden from construction sites or

other off-site sources. Clean soil, upon which vegetation will be established, will meet the same specifications as for residential yard backfill (i.e., less than 100 ppm lead, 100 ppm arsenic, and 5 ppm cadmium based on the average of sampling results, with no individual sample exceeding 150 ppm lead). Sampling for compliance with the concentration requirements will be the same as for residential areas remediation activities (see Appendix B of the Residential Yards RDR). A comprehensive sampling program will be conducted for all barrier materials. In summary, this program consists of collecting a sample for every 200 cubic yards of barrier material, and one duplicate quality assurance sample for every ten barrier samples.

3.6.3 Revegetation

Vegetation types to be established on remediated ROW will be indigenous grasses, as described below. ROW where sod currently exists will generally be sodded after placement of clean soil. At the discretion of the Settling Defendants, sod may be used in certain other cases if immediate land-use practices could result in barrier disruption. Other areas that may be sodded include ROW adjacent to, and with unrestricted access from, child-care facilities or other play areas.

A mixture of grasses, primarily consisting of red top, but also including timothy, orchard grass, and Canada blue grass, will be used in areas assessed to require seeding. The mixture will be applied at an approximate rate of 20 pounds Pure Live Seed per acre. Fertilizer and mulch, when required, will be applied at a rate of 400 pounds per acre and 1,000 pounds per acre, respectively. This application rate may also be varied depending on site-specific conditions. Seed certification will be required to ensure that the grass seed used does not create a weed problem in nearby residential properties.

3.6.4 Rock Barrier Material

Rock is an appropriate material for areas where a more durable barrier is required, where vegetation is not acceptable due to fire or visibility concerns, or where surface conditions are not amenable to revegetation. As noted previously, such areas generally include secondary and access roads and power or natural gas substations. Rock barrier material may consist of one or a combination of the following materials: mine waste rock, quarry rock, or gravel. Factors that determine the type of rock barrier material to be used include:

- ROW location with respect to residential properties;
- ROW land use/existing material type; and
- availability of the various rock barrier material types.

material will Rock used as barrier meet same specifications as for clean soil (i.e., less than 100 ppm lead, 100 ppm arsenic, and 5 ppm cadmium based on the arithmetic mean of sampling results, with no individual sample exceeding 150 ppm lead). The following table shows the typical material size in relation to the planned use. For general rock barrier material, the required gradation is a median size (D_{50}) approximately equal to 1.5 inches, with no individual particle exceeding 3 inches in In circumstances where larger-sized material is used (based on a consensus by the Settling Defendants, the owner, and IDHW or EPA), rolling may be required to ensure the integrity of the barrier. Rock barrier material will be screened, as required, to approximate the appropriate particle size distribution.

RECOMMENDED ROCK BARRIER SIZE

USE	SIZE
Road base material	No rock larger than 4"
Road surface material	No rock larger than .75", with no more than 16 percent fines (passing No. 200 mesh)
General barrier	D_{50} = 1.5", no rock larger than 3"

4.0 CONSTRUCTION CONSIDERATIONS

This section addresses the general construction procedures necessary to implement the remedial designs presented in Section 3.0. This section also addresses scheduling for completion of the various actions. As previously noted, inspection of the various Area I ROW will be used to verify specific areas in need of remediation and the types of remediation to be implemented.

4.1 REMOVAL AND REPLACEMENT

As discussed in earlier sections, excavation of contaminated soils, prior to barrier placement, may be implemented to accommodate local drainage and grading requirements. Contaminated soils requiring removal will be excavated by backhoe, Bobcat, or other suitable means and will be transported by covered dump truck to the Page Pond repository or other area approved by EPA in consultations with the State. If materials are encountered which would have lead concentrations in excess of mine waste rock or tailings, they will be transported to an approved location in the Smelter Complex. Prior to excavation, the target area may be wetted, as required, to limit dust generation. Air monitoring will be conducted in accordance with the health and safety requirements provided in each Residential Areas Annual Remedial Action Work Plan.

4.2 PLACEMENT OF CLEAN SOIL

Clean soil will be transported by truck to ROW that require a clean soil barrier. At each target ROW, the soil will be spread in a single lift by bulldozer, or other suitable means, to the specified 6- or 12-inch thickness. The thickness of the finished clean soil cover will be verified using methods that are consistent with those presented in Appendix E of the Residential Yards RDR. Dust control during transportation and application, if necessary, will be accomplished by wetting the transportation route and the application site using a water truck. Barrier material will be

placed in early spring/summer to promote vegetation establishment prior to potentially erosive conditions occurring in winter.

4.3 REVEGETATION

Revegetation will be accomplished by seeding using the materials and rates specified in Section 3.6.3. As noted in that section, sod will be utilized for ROW where immediate vegetation is necessary to protect the barrier and/or members of the sensitive population. Such areas include ROW adjacent to, and with unrestricted access from, child-care facilities or other play areas. Also, sod may be utilized at the discretion of the Settling Defendants to expedite the remediation process in areas with high pedestrian traffic such as church yards and parks or portions thereof, as well as in ROW areas with existing landscaping. Seeding will take place in the late spring (approximately April 15 through June 15) to promote vegetative survival and establishment. Should weather or other site conditions preclude access during this time period, seeding may take place in the late fall. Experience in other parts of the Site indicates that seeds distributed in the late fall will remain dormant until the early spring, when germination occurs.

Rights-of-way that are revegetated over the protective barrier layer of clean soil will be inspected annually to characterize progress toward success. Inspection will include measurement of percent cover using a calibrated hoop. Revegetation success is defined as a minimum of 85 percent cover after three years of growth. Areas that are assessed to be inadequately revegetated within three years of seeding will be reseeded by the Settling Defendants, if the lack of revegetation success is not attributable to the land-use practices of the ROW owner. After attaining 85 percent cover, annual inspections of cover by the Settling Defendants will cease. If all inspection criteria have been met (Section 4.4), the property owner will assume the responsibility of maintaining the barrier integrity, which includes the 85 percent cover, as outlined in the ICP.

4.4 PLACEMENT OF ROCK BARRIER MATERIAL

Rock barrier material will be transported by truck to ROW that require a rock barrier. At each target area the rock will be spread in a single lift bulldozer, or other suitable means such as motor-grader, to the specified 6- or 12-inch thickness. Dust control during transportation and application, if necessary, will be accomplished by wetting the application site using a water truck. Precautions will be exercised when grading to prevent mixing of the base material with the rock barrier. Rock barrier material will meet the specifications for clean soils discussed in Section 3.6.4.

capped with a rock barrier will be inspected approximately one year after remediation to assess whether the barrier has been disturbed. Repairs to the barrier will be made by the Settling Defendants, as needed, if barrier disturbance is linked to its installation and not to the land-use practices of the Invasion of vegetation will not be considered as a disturbance and, therefore, will not be removed. Areas assessed to exhibit excessive erosion due to the material selected or the method by which it was placed will be mitigated using additional vegetation, runon/runoff controls, or selective placement of rock barrier material if the excessive erosion is not attributable to the land-use practices of the ROW owner. The selection of erosion If the inspections control measures will be site-specific. indicate that no repairs are required, subsequent maintenance will become the responsibility of the property owner. barrier repairs are required in the first year after remediation as a result of erosion or other non-owner related causes, the Settling Defendants will perform the repairs and will be responsible for an additional inspection the following year. If no further problems are identified during the second inspection, future inspection and maintenance will become the responsibility of the property owner.

4.5 SCHEDULE

Rights-of-way within Area I will be remediated consistent with the schedule for the Residential Yards Element of Work, as presented in the SOW. .

4 - 4

5.0 OPERATION AND MAINTENANCE

The ICP developed for the Bunker Hill Superfund Site is expected to accomplish the long-term operation and maintenance requirements for the remediation activities addressed by this RDR. The ICP will designate proper soil handling, pick-up, and disposal methods and will provide guidelines and requirements to ensure the long-term integrity of barriers installed as part of the ROW remediation program.

6.0 SUMMARY OF PERTINENT REMEDIAL DESIGN INVESTIGATIONS

Soil sampling will be required for many of the ROW to establish the need for remedial action. Specific remedial action plans will be developed for each ROW with 1,000 ppm lead or greater in the surface soils as part of the Residential Areas Annual Remedial Action Work Plans. As such, additional information for the remedial design phase is not required since specific design details will be developed based on the process described herein.

6-1

7.0 FUTURE DELIVERABLES (PLANS AND REPORTS)

The following described plans and reports will be submitted to IDHW and/or EPA for the ROW Element of Work in Area I.

7.1 GENERAL PROJECT MANAGEMENT

7.1.1 Project Management Monthly Reports

Monthly reports submitted pursuant to Section XI of the Consent Decree will include a section on the ROW Element of Work when applicable. The ROW section will include a minimum of the following information:

- General description of the work.
- Activities/tasks undertaken during the reporting period, and expected to be undertaken during the next reporting period.
- Identification of issues and actions that have been or will be taken to resolve the issues.
- Status of the ROW remediation schedule and any proposed schedule changes.

7.1.2 Technical Memoranda

Technical memoranda are the mechanism for requesting material modification of plans, designs, and schedules. Technical memoranda will not be prepared or required for non-material field changes that have been approved by the agencies. In the event that the Settling Defendants determine that modification of an approved plan, design, or schedule is necessary, the Settling Defendants will submit a written request for the modification to the Agency Project Coordinators which will include, but may not be limited to, the following information:

- General description of and purpose for the modification.
- Justification, including necessary calculations (if any), for the modification.
- Actions to be taken to implement the modification, including any actions related to subsidiary documents, milestone events, or activities affected by the modification.
- Recommendations.

7.2 REMEDIAL DESIGN

No further design submittals beyond this RDR will be required for the ROW Element of Work.

7.3 REMEDIAL ACTION

Rights-of-way will be remediated as part of the overall remedial actions for a given Reasonably Segregable Area of Area I. Specific remedial actions within the Area I ROW will be developed as part of the Residential Areas Annual Remedial Action Work Plans, as described below.

7.3.1 Residential Areas Annual Remedial Action Work Plans

Each year the Settling Defendants will submit to the appropriate agencies a Residential Areas Annual Remedial Action Work Plan outlining the proposed remediation activities to be completed during the construction season (barring unusual weather, the construction season will generally occur from mid-June to mid-October). Included in these Work Plans will be remediation activities planned for the ROW. Each year, the draft Residential Areas Annual Remedial Action Work Plan will be submitted for review and approval on or before April 15th, prior to the start of each construction season. At a minimum the work plans will include:

- Scope of the proposed remediation (i.e., the number of ROW to be remediated), and a map showing the areas proposed for remediation during the construction season.
- Sampling data.
- Estimated remediation schedule.
- Any deviations or changes from the guidelines or procedures outlined in the ROW RDR.
- Plan for coordinating, integrating, and communicating with the various agencies.

Rights-of-way will be sampled according to the remediation schedule developed by the Settling Defendants. The ROW sampling program will provide information to support preparation of the ROW portions of the Residential Areas Annual Remedial Action Work Plans for Area I. The sampling program will be designed so that the ROW designated for remediation will be sampled in the year prior to the remediation year. For example, the ROW designated for remediation in the 1995 work plan will be sampled in 1994. Sampling of ROW will be conducted per Section 3.1 of this RDR and sample analysis will be conducted per the Sampling and Analysis Plan included as Appendix B of the Residential Yards RDR.

The analytical results of the sampling program will be provided to the agencies as soon as is practicable after the results have been received and validated by the Settling Defendants. The data will be provided in a format acceptable to the agencies.

7.3.2 Health and Safety

Health and safety aspects pertaining to ROW within each Reasonably Segregable Area will be addressed in the corresponding Residential Areas Annual Remedial Action Work Plan. Such aspects include descriptions of monitoring activities to be undertaken during remediation of ROW.

7.3.3 Annual Construction Completion Report

Construction activities completed during each construction season will be summarized in an annual construction completion report. These reports will contain a complete listing and description of construction activities associated with the ROW Element of Work that were completed during the previous construction season. These reports will be submitted to the agencies within 60 days after the construction activities for that construction season are completed.

8.0 CERTIFICATION OF COMPLETION OF REMEDIAL ACTION

Certification of the completion of remedial action in a Reasonably Segregable Area is defined as the EPA, in consultations with IDHW, acknowledging the achievement of Performance Standards (as outlined in Section 1.2) for that portion of the remedial action.

Rights-of-way certification will be conducted on a Reasonably Segregable Area basis. Specifically, Residential Area Annual Remedial Action Work Plans will be developed with the goal of remediating as many of the Area I ROW located within one or a group of Reasonably Segregable Areas as practical during one construction season. Reasonably Segregable Areas of Area I are defined in the SOW and the Consent Decree.

The Performance Standards for ROW will considered to be achieved when all commercial properties with lead concentrations of 1,000 ppm or greater in surface soils within each Reasonably Segregable Area have been remediated in accordance with this RDR and when all clean soil covers and rock barriers in that Reasonably Segregable Area have been verified as being of the appropriate thickness. When the Settling Defendants believe that the Performance Standards for a Reasonably Segregable Area have been met, they will submit a Completion of Remedial Action Certification Report to EPA and IDHW for review and approval. Barrier thickness certification will be accomplished using methods consistent with those presented in Appendix E of the Residential Yards RDR.

9.0 REFERENCES

- MFG, 1992a. McCulley, Frick & Gilman, Inc. Bunker Hill Superfund Site Feasibility Study Report, May, 1992.
- MFG, 1992b. McCulley, Frick & Gilman, Inc. Bunker Hill Superfund Site Remedial Investigation Report, May, 1992.
- CH2M HILL, 1990. CH2M Hill, Phase II Remedial Investigation Data Summary Report for The Bunker Hill CERCLA Site Populated Areas RI/FS, September 1990.

. • • •

TABLES

Table 3-1 REQUIRED REMEDIAL ACTIONS FOR AREA I ROW

Primary Highways and Roads	Action
Gravel Shoulders	Rock barrier, revegetation, or access controls
Medians/Grass Shoulders	Revegetation, barrier placement with revegetation, or access controls
City Streets and Alleys Not Addressed by Other RDRs	Action
Road Surfâce - Gravel	Rock Barrier
Shoulder	Rock Barrier or Clean Soil w/ Revegetation
WWP Substations in Area I	Action
Access Roads	Rock Barrier
Fenced Areas	Revegetation
Other Areas	Rock Barrier, Clean Soil w/ Revegetation, or Access Controls
Buried Utility Corridors Not Addressed by Other Actions	Action
All Areas	Addressed Consistent with Actions in Adjacent Areas

FIGURES

FIGURES

McCulley Frick & Gilman, Inc.

Austin Office

8900 Business Park Drive Austin, TX 78759-7439 512/338-1667 Fax: 338-1331

Wallace Office

524 Bank Street Suite 207 Wallace, ID 83873 208/556-6811 Fax: 556-7271

San Francisco Office

5 Third Street Suite 400 San Francisco, CA 94103-3205 415/495-7110 Fax: 495-7107

Missoula Office

Hammond Arcade Building 101 South Higgins Avenue Suite 12 Missoula, MT 59802 406/728-4600 Fax: 728-4698 Seattle Office

Boulder Office

737 29th Street

Boulder, CO

303/447-1823

Fax: 447-1836

80303-2317

Suite 202

3400 188th Street Suite 400 Lynnwood, WA 98037-4708 206/778-8252 Fax: 771-8842